Religious Residue: Cross-Cultural Evidence That Religious Psychology and Behavior Persist Following Deidentification

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More than 1 billion people worldwide report no religious affiliation. These religious “nones” represent the world’s third largest religion-related identity group and are a diverse group, with some having previous religious identification and others never identifying as religious. We examined how 3 forms of religious identification—current, former, and never—influence a range of cognitions, emotions, and behavior. Three studies using nationally representative samples of religious Western (United States), secular Western (Netherlands, New Zealand) and Eastern (Hong Kong) cultures showed evidence of a *religious residue* effect: Formerly religious individuals (i.e., religious “dones”) differed from never religious and currently religious individuals in cognitive, emotional, and behavioral processes. Study 1 ($n = 3,071$) offered initial cross-cultural evidence, which was extended in a preregistered replication study that also included measures of charitable contribution (Study 2; $n = 1,626$). Study 3 ($N = 31,464$) found that individuals who deidentified were still relatively likely to engage in prosocial behavior (e.g., volunteering) after leaving religion. This research has broad implications for understanding changing global trends in religious identification and their consequences for psychology and behavior.

Keywords: religious residue, religion, formerly religious, nonreligious, cross-cultural

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Religion is a cross-cultural phenomenon. After Christianity and Islam, the third largest affiliative group in the world consists of people who do not identify as religious (Pew-Templeton, 2015). During the next 35 years, the number of these religious “nones” is projected to grow from 1.1 billion to 1.2 billion. Accordingly, scientific research on religious nones has steadily increased (Baker & Smith, 2015; Shariff, Piazza, & Kramer, 2014; Norenzayan & Gervais, 2013; Zuckerman, Galen, & Pasquale, 2016). Despite

these contributions, current research obscures some of the complexity among religious nones, such as potential psychological and behavioral differences between people who have previous religious identification (i.e., religious *dones*) and others who have never identified as religious (i.e., religious *nones*). Neither religious dones nor religious nones identify as religious, but do these groups have identical psychological and behavioral patterns? Our research fills this gap in the literature.

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2 (<https://osf.io/9d8yg/>), which was also a preregistered replication (<https://osf.io/zvqg2/>) of Study 1, on the Open Science Framework (OSF). The relevant data, code, and materials from Studies 1 and 2 are available on the OSF (<https://osf.io/pwy5f/>). The code for Study 3 is available on the OSF (<https://osf.io/s6fwb/>). The data described in Study 3 are part of the New Zealand Attitudes and Values Study (NZAVS). Full copies of the NZAVS data files are held by all members of the NZAVS management team and advisory board. A deidentified data set containing the variables analyzed in this article is available on request from Chris G. Sibley or Joseph Bulbulia or any member of the NZAVS advisory board for the purposes of replication or checking of any published study using NZAVS data. A portion of this work was presented at the 2019 Midwestern Psychological Association and 2019 American Psychology Association conventions.

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Insufficiently differentiating between formerly religious and never religious individuals fails to identify the features associated with religious deidentification and the complex ways in which these two groups of individuals vary on cognitive, emotional, and motivational processes. This research is important because prior research on religion, and nonreligion, may conflate religious donees with religious nones, obscuring the research findings and potentially leading to inaccurate or incomplete results, especially when comparing religious and irreligious individuals to approximate the role of religion in psychology and behavior. Here, using nationally representative samples from a religious Western culture (United States), and secular Western (Netherlands, New Zealand) and Eastern (Hong Kong) cultures, we address this gap in the literature by testing the *religious residue hypothesis*, assessing whether formerly religious individuals differ from never religious and currently religious individuals in terms of their cognitive, emotional, and behavioral processes.

The Power of Social Identities

AQ: 3 A person's social identity is powerful. Each person can have multiple identities based on differing social categories (e.g., gender, sex, ethnicity, religion). These identities shape how people perceive themselves and others along such dimensions (Hogg, AQ: 4 2006), as well as how people treat others, such as engaging in AQ: 5 ingroup favoritism and outgroup prejudice (Brewer, 1999). According to social identity theory, one's identity is a potent source of self-esteem and plays a substantial role in cognitive, affective, and behavioral processes (Hornsey, 2008). Many identities are largely self-defined, based on perceptions of whether or not individuals meet the criteria that determine inclusion in that group's identity (Abrams & Hogg, 1990). This process has been called "self-categorization" (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) or "identification" (McCall & Simmons, 1978). For example, some people may identify as a "political conservative" if they perceive that they align with many of the core attributes of a politically conservative group; and such a designation is based, in part, on one's own perception and determination. In many domains, individuals define their own group membership based on cognitive representations of what they consider to be core features of the group, and some identities are relatively more stable over one's life (e.g., ethnicity), whereas others may be relative more labile and susceptible to change (e.g., religion). AQ: 6

Identity can be understood as a system of self-relevant meaning, in which individuals perceive themselves in relation to a shared, or culturally endorsed, standard of group membership (Burke, 2006). They compare their sense of self to the relevant comparison, and discrepancies between how individuals see themselves and the standard for group identity may lead individuals to shift or change identities. This discrepancy can lead to shifts in behavior, which is consistent with other meaning-focused approaches (cf. Park, 2010). Shifts can occur due internal or external forces. Internal sources of identity change include situations when people try to reconcile multiple identities where there might be tension (e.g., gender identity and spousal identity; Burke, 2006). External sources of identity change include situations where individuals are affected by outside stimuli (e.g., changes in gender-related identity following the birth of a child; Burke & Cast, 1997).

Although prior work suggests that adolescence is a period of particular identity formation (Erikson, 1993), throughout one's life, internal or external changes may elicit changes in one's perceived identity (Burke, 2006). For example, individuals begin identifying as parents following the birth of a child, which is a new identity. Alternatively, following a divorce, individuals may no longer identify as a spouse. Work from research on moral identity provides insights into how identity is formed and may change; given the link between religion and morality (McKay & Whitehouse, 2015), this may particularly be applicable to development of religious identity.

Prior experimental work has shown that morality is considered to be a central, if not predominant, feature of identity (Strohming & Nichols, 2014), and changes in morality are associated with viewing one's essence as being changed (De Freitas, Tobia, Newman, & Knobe, 2017). Other experimental work has shown that changes to morality are associated with perceived changes in identity among adults and children (Heiphetz, Strohming, Gelman, & Young, 2018). Thus, changes in a dimension that is central to one's core sense of self (i.e., morality) result in changes in one's sense of identity.

The Development of Religious Identity

One such powerful, yet somewhat malleable, social identity is religious identity (Hogg, Adelman, & Blagg, 2010; Ysseldyk, Matheson, & Anisman, 2010). How does religious identity develop? There are likely several pathways by which one might identify as religious; here we focus on two: immediate context (parenting) and broader context (culture). First, because religious identity, like some other social identities, is based in part by one's (early) formative relationships, it is likely that if one is raised in a religious household, they may be more likely to identify as religious (Hardy, Pratt, Pancer, Olsen, & Lawford, 2011). As children and adolescents develop coherent ways of making sense of the world and their place in it, they may draw from the predominant values and views of their primary caregivers as they seek to develop an identity and interact with the social world. Many of these identities are navigated in adolescence, as individuals wrestle with their broader sense of identity as a normal part of human development (Erikson, 1993), but they are strongly influenced by parental behavior in childhood. Individuals whose parents demonstrated strong religious behaviors, such as sacrificing time and resources for their religious beliefs, may have stronger and deeper religious identities (Lanman & Buhrmester, 2017). These high cost behaviors, known as credibility enhancing displays (CREDs), may be deeply integrated into one's schema and more likely to affect their religious identity. As these beliefs and values, as signaled by caregivers' CREDs, become more deeply integrated into individual cognitive processes, they may begin to affect an individual's representation of concepts in memory, such as whether people begin to form positive or negative associations with God. For example, people may begin to develop intuitive or implicit assumptions about God, or lay beliefs, which are also likely to be associated with their explicit attitudes toward God. Of course, there may be exceptions to the role of parents' values on children's religiousness in certain domains (see Evans, 2001; Heiphetz, Spelke, & Young, 2015; Kelemen, 2004); thus, the role of these CREDs deserves future attention. AQ: 7

Second, it is possible that cultural factors may affect one's religious identity. Previous work has documented the complex interplay between religion and culture (Cohen & Hill, 2007). Moreover, people hold multiple identities, such as a national identity and a religious identity, which may interact (Verkuyten & Yildiz, 2007). From this perspective, predominant cultural forces regarding prevailing views of religion in one's society may play a role in how people view religion and their own religious identity (e.g., perhaps some people consider themselves religious by default in a predominantly religious culture). One possibility is that in more collectivistic cultures, religious identities may be subject to external pressure and expectations, whereby religious identities may persist longer or more strongly than in less collectivistic cultures. On the other hand, it is possible that one's individual religious identity exerts strong effects on psychological processes and behaviors across a variety of cultural backgrounds. Saroglou and Cohen (2013) posited that four dimensions of religiousness—believing (i.e., beliefs regarding the supernatural), behaving (i.e., specific practices and moral attitudes), bonding (i.e., rituals that enhance community or connection with the transcendent), and belonging (i.e., affiliation with other religious group members)—may be rather universal in nature, though they are expressed differently across cultures. For example, religion has been linked with prosociality across cultures (Saroglou, 2013), though the particular expression may be culturally influenced. Given the various views of role of religion in culture, it is necessary to advance research that is conducted across cultural contexts to provide insights into whether or not the processes under investigation exist across cultures or are culturally-bound or -specific.

Religious Deidentification

AQ: 8 Religion is a rather malleable social identity (Hogg et al., 2010; Ysseldyk et al., 2010). Previous research has examined how people move in and out of various religious identities, with estimates suggesting that nearly one in three people switch religious identifications in their lifetime (Loveland, 2003; Suh & Russell, 2015; Uecker, Regnerus, & Vaaler, 2007). A particular shift in religious identity that we sought to explore was moving from identifying as religious to identifying as nonreligious—a process we call *religious deidentification*. Religious deidentification, like any other form of religious identity formation, likely unfolds over a process AQ: 10 AQ: 11 AQ: 12 (LeDrew, 2013), and it may be motivated by various factors.

We suspect that this process of religious deidentification may be similar to other types of identity change. Prior work suggest that identity change may be sudden or gradual, and it may vary in degree (Todd, 2005). However, identities are generally relatively resistant to change, and when change does it occur, it happens rather slowly (Burke, 2006). Thus, even following deidentification, there may be lingering effects of one's former identity.

What might account for the persistent effect of religious identity on an individuals' thoughts, feelings, and behavior following deidentification? We see two routes: the power of schematic processing and the development of religious habits. First, religious identity is a schema that exerts a powerful influence on individual cognition, emotion, and behavior (McIntosh, 1995). One's religious identity is a central part of this schema. Drawing from a social identity perspective, previous research has underscored the value of considering how one's religious identity affects their

cognitive, emotional, and behavioral processing (Ysseldyk et al., 2010). One's views about their religious group membership exerts considerable influence on their psychology.

Schemas help people organize their experiences and interpret the social world. People adjust their schemas through assimilation and accommodation, which helps them better understand themselves, others, and their place within their environment. That is, they incorporate information from their social worlds in ways that are consistent with their schemas, or they modify their schemas to fit their experiences. Given that many features of religious beliefs may be relatively empirically untestable (e.g., Does God exist? What happens to me after I die?), religious individuals may be less likely to modify these schemas (see Ysseldyk et al., 2010). Therefore, religious schemas may persist, even when people stop identifying as religious.

Aaron Beck (1967) argued that some cognitive schemas exert such a strong influence on our psychology that they become resistant to change, creating a psychological residue (i.e., a lasting effect on schematic processing). This psychological residue may even apply to negative self-schemas. For example, people previously been diagnosed as having major depressive disorder may continue to show some signs of depressive thinking, feeling, and acting even when their symptoms subside and they no longer identify as a person diagnosed with the disorder. Numerous studies support this line of thinking: In these studies, researchers often compare people who had formerly been diagnosed with major depressive disorder and those who had never been diagnosed with major depressive disorder. Although both groups self-identify as nondepressed, people who formerly identified as depressed (vs. people who never identified as depressed) show vast differences in their interpretation of self-relevant information (Hedlund & Rude, 1995; Watkins & Moulds, 2007), memory and attention (Joormann & Gotlib, 2007; Romero, Sanchez, & Vazquez, 2014), implicit biases (Phillips, Hine, & Thorsteinsson, 2010), and neural processing of information related to guilt and social interactions (Elliott et al., 2012; Green, Lambon Ralph, Moll, Deakin & Zahn, 2012). The implication is that cognitive schemas become so deeply entrenched in our minds that previous modes of thinking and feeling persist following deidentification. Accordingly, we predicted a *religious residue effect*: following religious deidentification, people would still show lingering effects of religious psychology and behavior.

A second route by which religious identity may continue to affect individuals following deidentification is through the cultivation of habits. Habits can be conceptualized as knowledge structures that guide behavior, even automatically (Aarts & Dijksterhuis, 2000). Habits become engrained through nonrepetitive iterations, with practice and flexibility, and they affect psychology and behavior relatively automatically. They can be activated by contextual cues (Neal, Wood, Labrecque, & Lally, 2012), without awareness. Religion often prescribes sets of acceptable behaviors and proscribes unacceptable behaviors, which may lead to the cultivation of particular habits over time (Hampson, 2012). Over the period of religious identification, religious individuals may have developed a repertoire of habits, which may include religious morality or prosociality. In this way, the development of religious identification occurs much in the same way as any other habitual way of thinking, feeling, and acting. This reasoning, too, would lead us to predict the religious residue effect, because engaging in a pattern of particular behaviors while identifying as religious may

continue on, as relatively automatic habits, following deidentification.

Thus, in addition to maintaining implicit associations, explicit attitudes (e.g., positive attitudes toward God and religion) and behaviors (e.g., engaging in religious practices) typically associated with religion, we also explored whether the religious residue effect would also be evidenced in prosocial behavior. Previous research has linked religion and prosociality (Norenzayan & Shariff, 2008), and a recent meta-analysis provided robust evidence that the cognitive activation of religious schemas enhances prosociality (Shariff, Willard, Andersen, & Norenzayan, 2016). However, this meta-analysis also revealed that such effects were only reliably detected among religious individuals, who had existing religious schemas. This underscores the possibility that the degree to which one has elaborate or well-developed cognitive schemas for religion, one may tend to act more prosocially (but see also Galen, 2012, and Preston & Ritter, 2013, for critiques of religious prosociality and the possibility of a religious in-group bias). Accordingly, formerly religious individuals—whose religious psychology may persist because of entrenched cognitive schemas surrounding religion or automatic religious habits—may behave more like currently religious than never religious individuals in terms of prosociality.

We predicted that the religious residue effect would occur most strongly among people who grew up in households where they were exposed to frequent religious credibility enhancing displays (CREDS; Lanman & Buhrmester, 2017). This follows Allport's (1954) suggestion that to the extent that children identify with their parents, they will show similar psychological and behavioral responses over time. Through repeated environmental exposure to religious credibility enhancing displays, we predicted that people would develop strong positive, implicit associations with religious concepts (i.e., God). Indeed, previous work has revealed that such displays by parents are associated with increased religious beliefs and values in their children (Milevsky, Szuchman, & Milevsky, 2008). Compared with explicit attitudes, implicit associations tend to be very stable over time because they "have their roots in long-term socialization experiences" (Gawronski, LeBel, & Peters, 2007, p. 181). Therefore, we predicted that more exposure to socialization experiences related to religious credibility enhancing displays would be associated with more positive implicit associations toward God. Given meta-analytic evidence showing a correlation between implicit associations and explicit attitudes (Kurdi et al., 2019), we predicted that positive implicit associations toward God would relate to more positive explicit judgments and attitudes related to religious and God. In turn, we expected that more positive attitudes toward religion and God would relate to more behaviors associated with religiosity, namely prosocial behavior (Shariff et al., 2016). In support of this associative chain, prior work has found that parental involvement in religion exerts an indirect effect on a child's moral attitude via religious beliefs and involvement (Scheepers & Van Der Slik, 1998).

Overview and Hypotheses

Within the context of religious identity, we predicted a religious residue effect. Compared with people who have never identified as religious, formerly religious people are more likely to experience exposure to religious credibility enhancing displays (e.g., caregiv-

ers acting as good religious role models, engaging in religious volunteer or charity work; Lanman & Buhrmester, 2017), to form positive implicit associations with God, and to develop positive explicit attitudes toward God and religious people, hold religious beliefs, and engage in religious activities. Such religious cognitions and experiences may have changed their cognitive, emotional, and motivational processes in lasting ways that persist beyond religious deidentification.

Thus, we predict that despite reporting identities similar to never religious individuals (e.g., not religious), the cognitive and emotional processes and experiences of formerly religious individuals will more closely resemble currently religious individuals. Put differently, we predict that religious identification will continue to leave lasting, though potentially diminished, effects on formerly religious individuals.

Moreover, we hypothesize that the religious residue effect is a basic feature of religious deidentification that will be found across various cultures: the United States, the Netherlands, Hong Kong, and New Zealand. The United States is a predominantly religious (and mostly Christian), Westernized nation. More than three fourths of the population reports being religious, including more than 70% of the total sample reporting Christian as their primary religious affiliation (Pew Research Center, 2016). According to the Pew-Templeton's Global Religious Futures Project (2015), the number of religiously unaffiliated individuals is expected to rise from roughly 16% to more than 25% in the next 35 years, suggesting religious deidentification is occurring in this sample.

The Netherlands is a rather secular, Westernized nation. Roughly three-fifths of the population is religious, including half of the respondents in the sample indicating Christianity as their religious affiliation. However, more than two-fifths (42.1%) report no religious affiliation. Importantly, it is estimated that the number of religiously unaffiliated will rise to nearly half of the population (49.1%), whereas the number of Christians is anticipated to fall below 40% in the next 35 years (Pew-Templeton, 2015). This suggests that religious deidentification is likely occurring in that sample.

Hong Kong is a predominantly secular, Easternized nation in which the majority (56.1%) of the population reports no religious affiliation. This country was selected as part of the comparison because of its cultural differences to the other three countries, both in terms of predominant religious affiliations and prevailing cultural norms. Over the next 35 years, it is projected that the country will be nearly evenly split between religious (50.9%) and nonreligious (49.1%) individuals (Pew-Templeton, 2015).

New Zealand is a dynamic secular, Western nation. More than two thirds of the population reports being religious, including more 57% of the total sample reporting Christianity as their primary religious affiliation (Pew Research Center, 2016). According to the Pew-Templeton's Global Religious Futures Project (2015), the number of religiously unaffiliated individuals is expected to rise from roughly 37% to more than 45% in the next 35 years, suggesting religious deidentification is occurring in this sample.

Study 1 was a nationally representative sample from the United States, the Netherlands, and Hong Kong, in which we compared currently religious, formerly religious, and never religious individuals across a variety of cognitive and emotional domains. Study 2 was a targeted replication, seeking equal samples of these three religious groups in each of the three cultures, that also included

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behavioral measures. Study 3 was a test of our religious residue hypothesis in a nationally representative longitudinal sample from New Zealand (The New Zealand Attitudes and Values Study [NZAVS], $N = 31,604$), assessing volunteering rates among religious disaffiliates. We preregistered our hypotheses for Study 1 (<https://osf.io/mv6t9/>) and Study 2 (<https://osf.io/9d8yg/>), which was also a preregistered replication (<https://osf.io/zvqg2/>) of Study 1, on the Open Science Framework.

Ethics Statement

Studies 1 and 2 were approved by the Hope College Human Subjects Review Board (i.e., Institutional Review Board) at the first author's institution ("Understanding the Nature and Consequences of Religious Deidentification", Protocol #5c58b9b68 8739). The opportunity for Study 3 arose subsequent to data collection for Studies 1 and 2, as an ecologically valid test of our theoretical model. We used Wave 1 through Wave 9 (2009–2017) of the NZAVS, a longitudinal national study of New Zealanders' social attitudes, personality, and health outcomes. Participants were sampled from the New Zealand electoral roll, a list of adults 18 years of age or older who are eligible to vote. Participants completed either a paper or online version of the survey and provided written consent to participate. All responses were anonymized, and personal identifying information was stored in an encrypted server separately from questionnaire data to ensure that individual participants could not be identified. Ethical approval was provided by the University of Auckland Human Participants Ethics Committee (reference number: 014889).

Study 1

Method

Participants. We preregistered our hypotheses for Study 1 (<https://osf.io/mv6t9/>). Because we did not know the potential size of the predicted effects, we sought at least 1,000 participants from each country, which would be sufficient for detecting small effects (Cohen, 1992). Participants ($N = 3,071$; 1,557 females, 1,507 males, seven did not report) were drawn from nationally representative samples from the United States ($n = 1,020$), the Netherlands ($n = 1,022$), and Hong Kong ($n = 1,029$) by Qualtrics Panels.¹ Participants indicated which of the three statements best described their religious identity: (a) "I currently identify as religious" (i.e., *currently religious*), (b) "I was formerly religious, but no longer identify as religious" (i.e., *formerly religious*), or (c) "I have never identified as religious" (i.e., *never religious*). Across the three countries, 41.65% ($n = 1,279$) were currently religious, 37.41% ($n = 1,149$) were never religious, and 20.94% ($n = 643$) were formerly religious. Descriptive statistics for the Study 1 sample are presented in Table 1.

Materials and procedure. Participants responded to items through a secure online medium about their religious identity, beliefs, and practices, including single item indicators assessing their (a) commitment to their current beliefs about religion (1–7 scale), (b) certainty of religious (dis)belief (0–100 scale), (c) attitude toward God (–100 to + 100 scale), (d) attitude toward religious individuals (–100 to + 100 scale), (e) attitude toward religion in general (–100 to + 100 scale), (f) frequency of

religious practices (0–100 scale), and (f) frequency of interacting with religious individuals (0–100 scale). They also completed the credibility enhancing displays (CREDs) scale, which is a seven-item measure ($\alpha = .96$) that assesses how often participants were exposed to religious behaviors during childhood on a 7-point scale (e.g., "Overall, to what extent did your caregivers(s) act as good religious role models?"; Lanman & Buhrmester, 2017).

Given correlational and experimental research linking religiousness with prosocial behavior (Guo, Liu, & Tian, 2020; Shariff et al., 2016), participants also completed measures of prosociality, including a two-item measure of self-rated subjective prosociality ("I'm a helpful person" and "I prioritize others' well-being above my own"; $r = .45$) and the Social Values Orientation Scale (Murphy, Ackermann, & Handergaaf, 2011). To assess religious residue at an implicit level, participants also completed an implicit associations test for attitudes toward God (Carpenter et al., 2018), in which participants pair God-related (e.g., "almighty", "creator", "deity") and animal-related (e.g., "antelope", "cat", "ostrich") words with positive and negative words in several iterative blocks. Higher scores indicate a quicker latency for pairing God-related words with positive concepts, indicating more positive implicitly assessed attitudes toward God.

Results

Prevalence of formerly religious people. Across representative samples from the United States, Netherlands, and Hong Kong, more than one in five (20.94%) people reported being formerly religious. This is a sizable portion of the population and suggests disambiguating people in terms of religious identification is worthwhile.

Religious cognition, emotion, and practices. We ran a series of one-way analyses of variance (ANOVAs) to compare groups across our key dependent variables (see Table 2; means that do not share a subscript within a row significantly differ [$p < .05$]). Consistent with the religious residue hypothesis, people who currently identified as religious reported different psychological and behavioral inclinations from people who formerly identified as religious, who in turn differed from people who had never identified as religious. The religious residue effect was robust across a variety of explicit measures, including positive attitudes toward God, exposure to credibility enhancing displays growing up, commitment to religious beliefs, frequency of engaging in religious practices, frequency of interacting with religious individuals, and global attitudes toward God, religious individuals, and religion in general. Unexpectedly, both current and formerly religious people also reported higher negative attitudes toward God compared with people who were never religious. We also examined implicit associations toward God. As predicted, currently religious individuals had significantly stronger positive implicit assessed attitudes toward God than did formerly religious individuals, who in turn had significantly stronger positive associations toward God than did never religious individuals (see Figure 1).

¹ Samples from Studies 1 and 2 were gathered to reflect the national composition of citizens across age, gender, and ethnicity. However, given that data were collected online, and data panel participants are a subset of larger populations, participants may be not entirely representative of all individuals in that country.

Table 1
Participant Descriptive Statistics for Studies 1 and 2

Variable	Study 1			Study 2		
	Hong Kong	Netherlands	United States	Hong Kong	Netherlands	United States
Sex						
Male	51%	49.10%	47.40%	46.5%	50.7%	47.8%
Female	49%	50.90%	52.60%	53.5%	49.3%	52.2%
Age						
Age <i>M</i> (<i>SD</i>)	38.17 (12.37)	46.36 (15.71)	46.38 (16.49)	36.75 (11.86)	43.41 (15.13)	46.84 (16.61)
Age range	18–98	18–84	18–98	18–67	18–93	18–99
Ethnicity						
White/Caucasian	1.8%	89.9%	62.6%	4.3%	86.5%	63.4%
Hispanic/Latino(a)	0.4%	1.2%	17.1%	0.8%	1.8%	17%
Black	0.1%	3.1%	13.4%	0%	3.3%	12.7%
Asian	97.4%	1.9%	5.2%	93.5%	3.8%	5.1%
Native American	0%	0.2%	1%	1%	0.4%	0.3%
Other	0.4%	3.8%	0.7%	0.4%	4.2%	1.5%
Religious affiliation						
Christian	38.4%	45.7%	65%	40%	44.9%	49.7%
Muslim	1%	2.9%	1.6%	1.2%	3.5%	0.3%
Buddhist	13.3%	1.4%	1.5%	11.2%	1.8%	1.4%
Hindu	0.3%	0.5%	0.7%	0.8%	0.7%	0.3%
Jewish	0.6%	0.8%	3.6%	1.4%	0.5%	6.5%
Confucian	1%	0.2%	0.3%	0.6%	0.2%	0%
Taoist	1.9%	0.5%	0.4%	2.2%	0.2%	0.2%
Atheist	7%	22%	6%	6.1%	23.5%	10.8%
Agnostic	3.1%	5.2%	8.2%	4.5%	4.7%	12%
Other	33.3%	20.8%	12.8%	31.9%	20%	18.8%

Prosocial inclinations. Subsequent analyses also revealed religious residue in terms of participants' prosocial inclinations. People who identified as religious self-reported the highest levels of prosociality, followed by formerly religious people, who were followed by people who never identified as religious (see Table 2). We also examined differences on social value orientation, which provides a categorical orientation of altruistic, prosocial, individualistic, or competitive. A chi-square test, $\chi^2(6) = 31.67$, $p < .001$ revealed that currently religious individuals showed the highest levels of prosocial orientation

(35.7%), followed by formerly religious individuals (31.0%), and then never religious individuals (28.2%). These results offer the first evidence for the persistence of explicit and implicit psychological processes and behavioral inclinations following religious deidentification.

Cross-cultural differences. We examined whether we examined whether religious residue effects were of similar magnitudes across cultures. The effect sizes (Cohen *d*'s) comparing formerly religious and never religious individuals for the self-reported religious cognition and behaviors are plotted in the left

Table 2
Study 1 Means by Religious Identification Group

Variable	Range	Currently religious		Formerly religious		Never religious		ANOVA
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Religion variables								
CREDs	1–7	4.83 _a	1.43	3.89 _b	1.42	2.56 _c	1.44	$F(2, 3063) = 767.18$, $p < .001$
Attitude toward God–Positive	1–11	8.84 _a	2.15	5.10 _b	3.07	3.74 _c	2.83	$F(2, 3058) = 1200.19$, $p < .001$
Attitude toward God–Negative	1–11	3.85 _a	2.82	4.08 _a	2.65	3.12 _b	2.41	$F(2, 3059) = 36.91$, $p < .001$
Commitment to religious beliefs	1–7	5.34 _a	1.32	3.63 _b	1.72	3.08 _c	1.96	$F(2, 2911) = 560.23$, $p < .001$
Certainty of supernatural belief/disbelief	0–100	76.20 _a	23.14	58.19 _b	29.13	51.77 _c	33.93	$F(2, 2979) = 224.61$, $p < .001$
Global attitude toward God	–100 to 100	78.38 _a	26.47	53.75 _b	30.87	45.86 _c	34.53	$F(2, 1919) = 225.47$, $p < .001$
Global attitude toward religious individuals	–100 to 100	60.31 _a	34.07	14.75 _b	40.36	0.36 _c	42.02	$F(2, 2841) = 733.45$, $p < .001$
Global attitude toward religion in general	–100 to 100	62.04 _a	34.47	6.97 _b	46.41	–5.16 _c	45.96	$F(2, 2864) = 820.52$, $p < .001$
Frequency of religious practices	0–100	66.09 _a	27.79	23.77 _b	26.55	11.18 _c	20.09	$F(2, 2837) = 1441.19$, $p < .001$
Frequency of interacting with religious individuals	0–100	67.99 _a	24.93	41.38 _b	25.65	30.79 _c	26.43	$F(2, 2936) = 639.92$, $p < .001$
God IAT effect (positive attitudes toward God)	<i>d</i> (effect size)	0.63 _a	0.38	0.46 _b	0.40	0.34 _c	0.40	$F(2, 2729) = 153.19$, $p < .001$
Prosocial inclinations								
Self-rated prosociality	1–5	3.86 _a	0.73	3.63 _b	0.74	3.5 _c	0.78	$F(2, 3058) = 67.96$, $p < .001$

Note. ANOVA = analysis of variance; CREDs = credibility enhancing displays; IAT = Implicit Association Test. Means that do not share similar subscripts significantly differ ($p < .05$).

Figure 1. God IAT effect (d scores) by religious identification groups for Studies 1 and 2.

panel of Figure 2. The effects were present across all cultures, though they were slightly stronger among participants from Hong Kong.

Exploratory moderation results: The role of belief commitment. The potential effect of schemas on processing likely varies by individual. Previous research has found that the effects of cognitive activation of religious schemas was moderated by belief centrality—for individuals for whom religion was central, activating a religious schema resulted in greater existential well-being relative to those for whom religion was less central (Van Tongeren, Raad, McIntosh, & Pae, 2013). Similarly, other research suggests the potency of religious schema is greater for those with an intrinsic religious orientation (Jonas & Fischer, 2006; Vail et al., 2010). However, other research suggests that religious attitudes, such as prejudice toward religious outgroup

members, is found similarly across levels of religious orientation (Brandt & Van Tongeren, 2017). It is possible that religious schema operate differently based on belief centrality or commitment, though the type of process (e.g., prejudice) or context may also exert an influence. Accordingly, we explored whether these religious residue effects were moderated by belief commitment (i.e., “How committed are you to your current beliefs about religion?”). (Note that these analyses were exploratory and not pre-registered.)

We tested our moderation analyses using PROCESS (Hayes, 2013), which estimates the interaction effects over 5,000 bootstrapping iterations (see Figure 3). We examined significant interaction effects at ± 1 SD. There was a statistically significant interaction between religious identity and belief commitment on CREDs ($b = .14$, $SE = .04$, $t = -3.33$, $p < .001$). At low belief commitment, formerly religious individuals ($\hat{y} = 3.54$) were nearly identical to currently religious individuals ($\hat{y} = 3.59$), whereas never religious individuals reported a much lower level of CREDs ($\hat{y} = 2.48$). At high belief commitment, currently religious individuals reported the highest levels of CREDs ($y = 5.15$), followed by formerly religious individuals ($\hat{y} = 4.53$), and finally never religious individuals ($\hat{y} = 3.05$).

There was a statistically significant interaction between religious identity and belief commitment on positive attitudes toward God ($b = -.43$, $SE = .08$, $t = -5.53$, $p < .001$). The staircase pattern of currently, formerly, and never religious individuals held at low levels of belief commitment ($\hat{y} = 6.26$; $\hat{y} = 4.60$; $\hat{y} = 3.61$, respectively) and was magnified at higher levels of belief commitment ($\hat{y} = 9.48$; $y = 6.11$; $\hat{y} = 4.56$, respectively).

There was a statistically significant interaction between religious identity and belief commitment on negative attitudes toward God ($b = -.51$, $SE = .08$, $t = 6.12$, $p < .001$). Whereas at low levels of belief commitment, currently religious individuals ($\hat{y} = 5.11$) reported higher levels of negative attitudes toward God than did formerly religious ($\hat{y} = 3.95$) and never religious ($\hat{y} = 3.15$) individuals, at higher levels of belief commitment, formerly religious individuals reported the highest levels of negative attitudes toward God ($\hat{y} = 4.40$) than either currently religious ($\hat{y} = 3.56$) or never religious ($\hat{y} = 3.33$) individuals. Looked at differently, as belief commitment rises for currently religious individuals, nega-

Figure 2. Religious residue effects of self-reported religious cognitions and behaviors (top panel of Tables 2 and 3) in Study 1 (left panel) and Study 2 (right panel), by country. Panels report the mean effect size (Cohen's d) and 95% CI of mean difference between formerly religious and never religious individuals.

Figure 3. Exploratory moderation analyses in Study 1.

tive attitudes toward God decrease; however, as belief commitment rises for formerly religious individuals, negative attitudes toward God increase.

There was a statistically significant interaction between religious identity and belief commitment on implicit associations toward God (i.e., God Implicit Association Test [IAT]; $b = -.05$, $SE = .01$, $t = -4.03$, $p < .001$). At low belief commitment, formerly religious individuals ($\hat{\gamma} = .46$) were nearly identical to currently religious individuals ($\hat{\gamma} = .47$), whereas never religious individuals had less favorable implicit associations toward God ($\hat{\gamma} = .34$). At high belief commitment, currently religious individuals had the most positive associations with God ($\hat{\gamma} = .67$), followed by formerly religious individuals ($\hat{\gamma} = .44$), and finally never religious individuals ($\hat{\gamma} = .33$). Looked at differently, belief commitment was not observed to moderate the God IAT effect for formerly or never religious individuals, but it was positively associated with the God IAT effect for currently religious individuals: as belief commitment increased, so did positive associations with God.

Finally, there was a statistically significant interaction between religious identity and belief commitment on self-reported prosociality ($b = -.13$, $SE = .02$, $t = -5.60$, $p < .001$). At low belief commitment, formerly religious individuals ($\hat{\gamma} = 3.60$)

reported higher scores than currently religious individuals ($\hat{\gamma} = 3.37$) and never religious individuals ($\hat{\gamma} = 3.44$). At high belief commitment, currently religious individuals had the highest self-reported prosociality ($\hat{\gamma} = 3.98$), followed by formerly religious individuals ($\hat{\gamma} = 3.70$), and finally never religious individuals ($\hat{\gamma} = 3.66$).

Discussion

The results of Study 1 revealed several novel contributions. First, in nationally representative samples of three different cultures, approximately one in five participants reported being at one time religious but no longer identify as religious. Such a substantive portion of the sample to report being a religious “done” (i.e., formerly religious) suggests that scientific inquiry exploring this group of religious affiliates is feasible. Second, the results provide evidence for our predicted religious residue effect. Formerly religious individuals more closely resembled currently religious individuals than did never religious individuals on explicitly assessed (i.e., self-report) and implicitly assessed (e.g., God IAT) religious constructs. This suggests that such scientific inquiry is important and supported the idea that insufficiently differentiating between those who were at one time religious and those who were never

religious obscures meaningful differences, but disambiguating these groups is a valuable distinction that provides an important contribution to research on the religiously oriented cognitive, emotional, and motivational process of individuals. Third, these results reveal that this religious residue effect is robust across cultures. Religious “dones” differed from other religious “nones” in Hong Kong, the Netherlands, and the United States. Finally, exploratory analyses revealed these effects were moderated by religious commitment—the religious residue findings were stronger among those who held their beliefs with a greater degree of commitment, revealing the importance of considering individual differences in commitment in moderating the effects of religious deidentification.

After establishing evidence for the religious residue effect, we sought to replicate and extend these findings in an independent sample. In addition, (a) we expanded our attitudinal assessment of individuals of varied religious affiliation, and (b) because prior work has found that religion may be more strongly associated with self-reported prosociality than prosocial behavior (Shariff, 2015), we added behavioral measures of prosociality to build upon the results of Study 1, which relied on a self-report measure.

Study 2

Method

Study 2 was a preregistered replication (<https://osf.io/zvqg2>) and extension of Study 1 (the Study 2 hypotheses are also registered on the Open Science Framework at: <https://osf.io/9d8yg/>). Based on the results of Study 1, we anticipated that a minimum of 100 participants from each religious group in each country should be sufficient to detect a medium effect (Cohen, 1992). Participants ($N = 1,626$; 839 females, 787 males) were recruited by Qualtrics Panels and sampled from the United States ($n = 584$), the Netherlands ($n = 550$), and Hong Kong ($n = 492$). We aimed to acquire nationally representative samples from each country that included an equivalent number of participants from the three religious identification groups (current, former, and never), using the same self-identification of religious identity item from Study 1 (see Table 1). Across the three countries, 34.8% ($n = 566$) were currently religious, 30.00% ($n = 487$) were formerly religious, and 35.2% ($n = 573$) were never religious.

The procedure and materials were the same as Study 1, with three exceptions. First, we added additional items assessing participants’ attitude toward (−100 to +100) and frequency of interacting with (0–100) currently, formerly, and never religious individuals, respectively. Second, we included two actual behavioral measures of prosociality. Participants were given the option to donate a percentage of their monetary compensation (0–100%) to Save The Children, which is an international nonprofit organization working to protect the rights of children in developing countries. Participants were also given the option to volunteer to complete another short survey being piloted by the researchers for no additional compensation; they indicated if they were willing to volunteer (yes/no) and how many minutes they would like to volunteer (5–15 min). During debriefing, participants were told that no actual money was deducted from the participants, nor were they required to participate in the additional pilot study.²

Results

Religious cognition, emotion, and practices. Consistent with Study 1, after running a series of one-way ANOVAs to compare groups across our key dependent variables (see Table 3), we observed widespread and robust support for the religious residue hypothesis. As predicted, current, former, and never religious individuals differed from each other on a variety of explicit measures (e.g., positive attitudes toward God, exposure to credibility enhancing displays during childhood, commitment to religious beliefs, frequency of engaging in religious practices, frequency of interacting with religious/formerly religious/never religious individuals, and global attitudes toward God, religious individuals, and religion in general). We again found greater negative attitudes toward God among current and former religious people compared with never religious people. In terms of implicit processes, we replicated our initial findings, in which people who currently identified as religious showed stronger positive associations with God, followed by formerly religious people, who in turn demonstrated stronger positive associations toward God than did never religious people (see Figure 1). Thus, explicit and implicit measures point to the persistence of religious beliefs and attitudes following religious deidentification.

Prosociality. Currently religious people self-reported higher levels of prosociality than did formerly religious people, who in turn reported greater prosociality than never religious people (see Table 3). We also observed signs of the residue effect on two new behavioral measures of prosociality: donating money and time. Currently religious donated more of their compensation to charity than did formerly religious people, who donated more to charity than did never religious people. However, currently religious people volunteered more of their time than did formerly or never religious individuals, $F(2, 872) = 8.21, p < .001$, among those who agreed to donate, and $F(2, 1623) = 13.85, p < .001$, including all participants. These behavioral findings replicate and extend our initial self-report data by showing that, in terms of self-reported prosociality and charitable donation, formerly religious people report and act more prosocial than do people who never identified as religious but less prosocial than people who currently identify as religious.

Serial mediation model. We tested a serial mediation model over 5,000 bootstrapping iterations using PROCESS (Hayes, 2013). This model predicted that formerly religious individuals, compared with never religious individuals, would have experienced more frequent childhood exposure to caregivers’ religious CREDs. Because implicit associations develop largely as a response to recurrent socialization experiences (Gawronski et al., 2007), we predicted that religious deidentifiers’ greater CREDs would correlate with more positive, implicit associations with God (God IAT). Such implicit associations would correlate with explicitly assessed positive attitudes toward God (Attitudes toward God Scale-9), which, in turn, would be associated with greater charitable monetary donations. Such a prediction is in line with prior work showing that parental religious involvement indirectly affects a child’s moral attitude via religious beliefs (Scheepers &

² After the study, a donation was made to Save The Children by the first author, given the generous response of the participants.

Table 3
Study 2 Means by Religious Identification Group

Variable	Range	Currently religious		Formerly religious		Never religious		ANOVA
		M	SD	M	SD	M	SD	
Religion variables								
CREDs	1–7	4.70 _a	1.46	4.08 _b	1.46	2.74 _c	1.55	$F(2, 1623) = 257.98, p < .001$
Attitude toward God–Positive	1–11	8.79 _a	2.17	5.06 _b	3.20	3.95 _c	3.00	$F(2, 1623) = 460.80, p < .001$
Attitude toward God–Negative	1–11	3.98 _a	2.89	3.88 _a	2.80	2.96 _b	2.28	$F(2, 1623) = 24.87, p < .001$
Commitment to religious beliefs	1–7	5.28 _a	1.30	3.67 _b	1.80	3.30 _c	2.11	$F(2, 1623) = 199.15, p < .001$
Certainty of supernatural belief/disbelief	0–100	75.21 _a	23.47	59.61 _b	28.99	54.19 _c	34.98	$F(2, 1623) = 76.86, p < .001$
Global attitude toward God	–100 to 100	77.77 _a	25.48	52.77 _b	34.49	46.13 _c	35.06	$F(2, 1027) = 113.21, p < .001$
Attitude toward currently religious individuals	–100 to 100	56.11 _a	36.24	11.15 _b	46.80	4.81 _c	41.42	$F(2, 1623) = 254.54, p < .001$
Attitude toward formerly religious individuals	–100 to 100	34.30 _a	41.99	26.02 _b	38.35	15.57 _c	35.81	$F(2, 1623) = 33.31, p < .001$
Attitude toward never religious individuals	–100 to 100	28.03 _a	44.57	21.94 _b	38.28	25.69 _{bc}	37.34	$F(2, 1623) = 3.024, p = .049$
Frequency of interacting with currently religious individuals	0–100	68.52 _a	23.04	48.18 _b	26.76	39.11 _c	28.00	$F(2, 1623) = 190.11, p < .001$
Frequency of interacting with formerly religious individuals	0–100	55.46 _a	26.48	45.56 _b	25.91	33.07 _c	26.61	$F(2, 1623) = 103.19, p < .001$
Frequency of interacting with never religious individuals	0–100	55.69 _a	26.63	46.83 _b	26.36	48.71 _b	29.85	$F(2, 1623) = 15.38, p < .001$
Global attitude toward religion in general	–100 to 100	60.39 _a	33.47	5.57 _b	49.96	–4.17 _c	46.69	$F(2, 1623) = 356.04, p < .001$
Frequency of religious practices	0–100	62.30 _a	29.34	20.28 _b	25.89	11.05 _c	21.31	$F(2, 1623) = 634.09, p < .001$
God IAT effect (positive attitudes toward God)	<i>d</i> (effect size)	0.60 _a	0.35	0.45 _b	0.38	0.36 _c	0.39	$F(2, 1450) = 55.30, p < .001$
Prosocial inclinations and behavior								
Self-rated prosociality	1–5	3.87 _a	0.74	3.72 _b	0.80	3.59 _c	0.75	$F(2, 1623) = 19.66, p < .001$
Donating money	0–100%	32.83 _a	35.74	19.59 _b	29.57	14.20 _c	24.65	$F(2, 1623) = 56.45, p < .001$
Donating time (including 0s)	0–15min	6.58 _a	5.92	5.24 _b	5.64	4.89 _b	5.50	$F(2, 1623) = 13.85, p < .001$
Donating time (only those agreeing)	5–15min	10.92 _a	3.25	10.21 _b	3.35	9.87 _b	3.44	$F(2, 872) = 8.21, p < .001$

Note. ANOVA = analysis of variance; CREDs = credibility enhancing displays; IAT = Implicit Association Test. Means that do not share similar subscripts significantly differ ($p < .05$).

RELIGIOUS RESIDUE

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Figure 4. Serial mediation model from Study 2.

AQ: 15 Van Der Slik, 1998). The data supported our predicted model (see Figure 4): completely standardized indirect effect = .001, $SE = .001$, 95% CI [.0002, .0023]. The total (mediated) effect was statistically significant ($p = .011$), but when including the serial mediators, the direct effect of religious residue was no longer statistically significant ($p = .849$).

Cross-cultural differences. As with Study 1, we examined whether religious residue effects were of similar magnitudes across cultures. The effect sizes (Cohen d 's) comparing formerly

religious and never religious individuals for the self-reported religious cognition and behaviors are plotted in the right panel of Figure 2. Once again, effects were present across all cultures, and they were slightly stronger among participants from Hong Kong.

Replication of exploratory moderation results. We sought to replicate the exploratory moderation effects we found in Study 1. (Again, we did not preregister these hypotheses.) Once again, we used PROCESS to estimate the interaction effects over 5,000 bootstrapping iterations (see Figure 5).

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Figure 5. Exploratory moderation analyses in Study 2.

We replicated the statistically significant interaction between religious identity and belief commitment on CREDs ($b = -.18$, $SE = .06$, $t = -3.02$, $p = .003$). At low belief commitment, formerly religious individuals ($\hat{y} = 3.86$) were nearly identical to currently religious individuals ($\hat{y} = 3.69$), whereas never religious individuals reported a much lower level of CREDs ($\hat{y} = 2.50$). At high belief commitment, currently religious individuals reported the highest levels of CREDs ($\hat{y} = 4.95$), followed by formerly religious individuals ($\hat{y} = 4.42$), and finally never religious individuals ($\hat{y} = 3.30$).

We replicated the statistically significant interaction between religious identity and belief commitment on positive attitudes toward God ($b = -.49$, $SE = .11$, $t = -4.42$, $p < .001$). The staircase pattern of currently, formerly, and never religious individuals held at low levels of belief commitment ($\hat{y} = 6.49$; $y = 4.69$; $\hat{y} = 3.73$, respectively) and was magnified at higher levels of belief commitment ($\hat{y} = 9.37$; $\hat{y} = 5.63$; $\hat{y} = 4.45$, respectively).

We replicated the statistically significant interaction between religious identity and belief commitment on negative attitudes toward God ($b = .45$, $SE = .11$, $t = 4.24$, $p < .001$). Whereas at low levels of belief commitment, currently religious individuals ($\hat{y} = 5.22$) reported higher levels of negative attitudes toward God, followed by formerly religious ($\hat{y} = 3.78$) and then never religious ($y = 2.96$) individuals, at higher levels of belief commitment, formerly religious individuals reported the highest levels of negative attitudes toward God ($\hat{y} = 4.04$) than either currently religious ($\hat{y} = 3.66$) or never religious ($\hat{y} = 2.96$) individuals. Once again, these data confirm that as belief commitment rises for currently religious individuals, negative attitudes toward God decrease; however, as belief commitment rises for formerly religious individuals, negative attitudes toward God increase.

We also replicated the statistically significant interaction between religious identity and belief commitment on implicit associations (i.e., God IAT; $b = -.05$, $SE = .02$, $t = -3.35$, $p = .001$). At low belief commitment, formerly religious individuals ($\hat{y} = .44$) were nearly identical to currently religious individuals ($\hat{y} = .41$), whereas never religious individuals had less favorable implicit associations toward God ($\hat{y} = .35$). At high belief commitment, currently religious individuals had most positive association with God ($\hat{y} = .65$), followed by formerly religious individuals ($\hat{y} = .46$), and finally never religious individuals ($\hat{y} = .38$). Once again, belief commitment did not moderate the God IAT effect for formerly or never religious individuals, but it was positively associated with the God IAT effect for currently religious individuals: as belief commitment increased, so did positive associations with God.

We replicated the statistically significant interaction between religious identity and belief commitment on self-reported prosociality ($b = -.11$, $SE = .03$, $t = -3.47$, $p < .001$). Again, at low belief commitment, formerly religious individuals ($\hat{y} = 3.65$) reported higher scores than currently religious individuals ($\hat{y} = 3.39$) and never religious individuals ($\hat{y} = 3.54$). At high belief commitment, currently religious individuals had the highest self-reported prosociality ($\hat{y} = 3.99$), followed by formerly religious individuals ($\hat{y} = 3.83$), and finally never religious individuals ($\hat{y} = 3.69$).

Finally, we explored the interaction between religious identity and belief commitment on actual donation behavior; this interac-

tion was significant ($b = 3.04$, $SE = 1.24$, $t = 2.45$, $p = .014$). Again, at low belief commitment, currently religious individuals ($\hat{y} = 37.01$) donated a greater percentage of their earnings than formerly religious individuals ($\hat{y} = 16.95$) and never religious individuals ($\hat{y} = 13.63$). At high belief commitment, currently religious individuals still had the highest donation amounts ($\hat{y} = 31.78$), and the gap between formerly religious individuals ($\hat{y} = 23.73$), and finally never religious individuals ($\hat{y} = 15.55$) widened, suggesting a stronger residue effect at higher levels of belief commitment.

Discussion

Study 2 was a preregistered replication and extension of Study 1. Critically, the results of Study 1 replicated in an independent sample aimed at achieving more even cell sizes across religious group and culture. Moreover, the results of Study 2 extended these findings by using behavioral assessments of prosociality, advancing prior work on the link between religion and prosocial behavior (Shariff, 2015). Thus, across self-report, implicit, and behavioral assessments of religiosity, these results provide evidence for a religious residue effect—formerly religious individuals often more closely resemble currently religious individuals than do never religious individuals. Religious “dones” differ from other religious “nones.” We also replicated the exploratory interaction effects found in Study 1, confirming how belief commitment moderates the religious residue effects on CREDs and (explicitly- and implicitly-assessed) attitudes toward God. These findings further demonstrate the importance of examining how individual differences may moderate the impact of religious deidentification on a variety of responses. The results of Study 2 also suggest a potential pathway by which these differences in religious psychology may be associated with differences in prosocial behavior. Variation in the perception of one’s upbringing, as it relates to the degree to which one’s parents served as a religious role model, is associated with implicitly assessed and explicitly assessed attitudes toward God, which is associated with differences in prosocial behavior. It is possible that one’s developmental trajectory has downstream consequences for behavior, though these cross-sectional data cannot provide firm evidence. For this reason, we noted that longitudinal data might examine psychological changes as people shift in their religious identities over time.

Accordingly, having found evidence of the religious residue effect in three distinct cultures—a religious Western culture (the United States), a secular Western culture (the Netherlands), and a secular Eastern culture (Hong Kong)—we sought to examine whether these associations on prosociality would also be present in a longitudinal sample. We also explored whether these findings were also evident in a different cultural setting (e.g., New Zealand). Whereas the United States is a relatively stable religious country, and the Netherlands relatively stable secular, New Zealand appears to dynamically secular, with the number people reporting no religious identification to continue to rise considerably in the next 35 years (Pew Research Center, 2017; Pew-Templeton, 2015). Study 3 directly assessed whether the religious residue results on prosociality would replicate in a longitudinal sample (and in this particular cultural setting).

Study 3

Building on evidence from Studies 1 and 2 that religion fosters prosociality, the *religious residue hypothesis* predicts that people who were once religious but then disaffiliate will tend to maintain their prosociality over time. Or put differently, religion tends to cultivate prosocial habits.

To assess the religious residue effect, it is important to recognize that there are five basic dynamics that are occurring within populations over time. Focusing on religion, there are processes of (a) religious affiliation and (b) religious disaffiliation: that is, people who were formally not religious may become religious; likewise people who were formally religious may disaffiliate. Focusing on prosociality, there are processes of (c) acquiring a practice of benefiting others and (d) losing a practice of benefiting others (prosociality); that is, people who were formally not helpful to others might adopt helping behaviors; by the same token, people who formally helped others might lose their helping behaviors. Apart from these dynamics of change, there are (e) patterns of stability across these four domains; that is, over time, people remain dis/affiliated or un/helpful in the same way. Previous literature investigating the prosocial effects of religion predicts that religious population will have a higher density of helping types than does the nonreligious population. The *religious residue hypothesis* focuses on the behaviors of people who were formerly religious and who engaged in helping behaviors: It predicts that when there is a loss of religious affiliation among religious volunteers, helping behaviors will tend to be conserved. Because patterns of stability tend to abide in any population, a rigorous test of the religious residue hypothesis would be to compare the expected rates of helping behavior among previously religious helpers who lose their religion. Here we assess these predictions in a large national probability sample from New Zealand who participated in the 2009–2017 NZAVS ($N = 31,604$).³

We focused on volunteering behavior of religious affiliates and assessed our model's prediction that religious people who volunteer will be more likely to retain volunteering behavior after the loss of religion than they will be to shed their helping behavior.

Method

Participants. The NZAVS, which was initiated in 2009, is an annual, longitudinal national probability sample of registered New Zealand voters. We sought to maximize statistical power to detect an effect by using all available data. Accordingly, we analyzed responses from years 2009–2017 (Waves 1 to 9) of the NZAVS that measured 31,604 participants at least once, which would be sufficient to detect a small effect (Cohen, 1992). (See Satherley et al., 2015 for a discussion of attrition in the NZAVS.) The demographics of the Sample are presented in Table 4. Full sampling details are given in Supplement A in the online supplemental material.

Measures.

Religious affiliation. Religious affiliation was assessed by asking people: "Do you identify with a religion and/or spiritual group?" (yes or no). "Yes" responses were coded as 1 and "No" responses were coded as 0. Missing responses were coded as "N/A" (see Table 5)

Prosociality. Prosociality was assessed using the open-ended NZAVS charitable time measure for "Hours spent [in] voluntary/

charitable work" which was used in the 2009 and 2013–2017 waves of the New Zealand Attitudes and Values Study. The majority of respondents in any given wave report zero volunteering/charitable work (see Table 5). We obtained a model for whether or not a person volunteered by coding zero responses as "0" and numerical responses greater than one as "1". Missing responses were coded as "N/A."

Statistical model. A multistate model is appropriate in the context of longitudinal research for understanding how people undergo processes over time. For example, a person might be religious at one time, and subsequently remain religious over a period. Then, a person might disaffiliate, and switch state from religious to nonreligious, and this state of affiliation might be tracked at the next measurement interval, and for subsequent intervals. It is possible that a person is unstably religious, switching back and forth between these two states. Here, a person undergoes an affiliation/disaffiliation process over time. Summed over many people who are religious or nonreligious, a multistate model can be appropriate for assessing the stability of religious affiliation and disaffiliation. Similarly, a person may switch between helping and nonhelping behaviors.

A hidden Markov model is a multistate model that estimates paths of latent state changes over time. In doing so, a hidden Markov model assumes that recorded observations are generated conditionally on the underlying latent state. These probability distributions are called "emissions probabilities." The model also seeks to estimate the transition probabilities of these latent states, or "state transition probabilities." The model estimates the state transition probabilities by assuming that the latent states at any given time are realizations of a Markov process. For a Markov process, all that matters to predicting future state transitions at any given time is the present state of the process. A key advantage of hidden Markov models is their ability to adjust for measurement error. Measurements recorded at any given time point are modeled as "tokens" that are "emitted" from the underlying latent states of stability and change for an unobserved latent process. In a hidden Markov model, the probability that an indicator ("token") measures ("emits") an underlying latent state is called an "emissions" probability.

To assess the specific predictions of the religious residue hypothesis, we used the hidden Markov model to simultaneously model processes of religious affiliation and volunteering among religiously affiliated and disaffiliated New Zealanders across nine measurement intervals, from 2009 to 2017. Our focus was on dynamics of change between four subpopulations of this society: (a) religiously affiliated people who do not volunteer ($R+ V-$); (b) unaffiliated people who do not volunteer ($R- V-$); (c) religiously affiliated people who volunteer ($R+ V+$); and (d) unaffiliated people who volunteer ($R- V+$). Our focus in this study was in assessing whether the loss of religious affiliation was associated with differences in the loss or gain of volunteering

³ A full list of publications from the NZAVS can be found at <https://www.psych.auckland.ac.nz/en/about/new-zealand-attitudes-and-values-study/nzavs-bibliography.html>. A deidentified data set containing the variables analyzed in this article is available on request from Chris G. Sibley or Joseph Bulbulia, or any member of the NZAVS advisory board for the purposes of replication or checking of any published study using NZAVS data.

Table 4
New Zealand Attitudes and Values Study, 2009–2017: Breakdown of Participants by Demographics Per Year

Variable	2009 (n = 6,518)	2010 (n = 4,441)	2011 (n = 6,884)	2012 (n = 12,179)	2013 (n = 18,261)	2014 (n = 15,820)	2015 (n = 13,942)	2016 (n = 21,936)	2017 (n = 1,7072)
Male									
Other	3,879 (59.5%)	2,735 (61.6%)	4,304 (62.5%)	7,621 (62.6%)	11,457 (62.7%)	9,982 (63.1%)	8,712 (62.5%)	13,705 (62.5%)	10,788 (63.2%)
Male	2,639 (40.5%)	1,706 (38.4%)	2,579 (37.5%)	4,555 (37.4%)	6,801 (37.2%)	5,785 (36.6%)	5,180 (37.2%)	8,156 (37.2%)	6,226 (36.5%)
Missing	0 (0%)	0 (0%)	1 (0.0%)	3 (0.0%)	3 (0.0%)	53 (0.3%)	50 (0.4%)	75 (0.3%)	58 (0.3%)
Age									
M (SD)	48.0 (15.8)	51.0 (15.2)	50.5 (15.9)	49.1 (15.0)	47.7 (14.1)	49.4 (14.0)	50.8 (13.9)	49.7 (13.9)	51.4 (13.7)
Median [Min, Max]	48.0 [18.0, 98.0]	51.0 [19.0, 95.0]	51.0 [18.0, 96.0]	50.0 [18.0, 94.0]	49.0 [18.0, 94.0]	50.0 [18.0, 95.0]	52.0 [19.0, 96.0]	51.0 [18.0, 97.0]	53.0 [18.0, 98.0]
Missing	34 (0.5%)	2 (0.0%)	24 (0.3%)	33 (0.3%)	32 (0.2%)	22 (0.1%)	17 (0.1%)	29 (0.1%)	22 (0.1%)
Ethnicity									
Not European	3,879 (59.5%)	2,735 (61.6%)	4,304 (62.5%)	7,621 (62.6%)	11,457 (62.7%)	9,982 (63.1%)	8,712 (62.5%)	13,705 (62.5%)	10,788 (63.2%)
European	2,639 (40.5%)	1,706 (38.4%)	2,579 (37.5%)	4,555 (37.4%)	6,801 (37.2%)	5,785 (36.6%)	5,180 (37.2%)	8,156 (37.2%)	6,226 (36.5%)
Missing	0 (0%)	0 (0%)	1 (0.0%)	3 (0.0%)	3 (0.0%)	53 (0.3%)	50 (0.4%)	75 (0.3%)	58 (0.3%)
Denominations									
Buddhist	50 (0.8%)	28 (0.6%)	54 (0.8%)	96 (0.8%)	171 (0.9%)	131 (0.8%)	117 (0.8%)	201 (0.9%)	148 (0.9%)
Christian	2,481 (38.1%)	1,753 (39.5%)	2,340 (34.0%)	4,248 (34.9%)	5,906 (32.3%)	5,157 (32.6%)	4,757 (34.1%)	7,118 (32.4%)	5,410 (31.7%)
Muslim	10 (0.2%)	5 (0.1%)	12 (0.2%)	30 (0.2%)	35 (0.2%)	24 (0.2%)	24 (0.2%)	47 (0.2%)	31 (0.2%)
Secular	3,533 (54.2%)	2,418 (54.4%)	4,037 (58.6%)	6,858 (56.3%)	10,599 (58.0%)	9,116 (57.6%)	7,975 (57.2%)	13,365 (60.9%)	10,872 (63.7%)
Others	285 (4.4%)	155 (3.5%)	277 (4.0%)	560 (4.6%)	767 (4.2%)	718 (4.5%)	946 (6.8%)	908 (4.1%)	548 (3.2%)
Missing	159 (2.4%)	82 (1.8%)	164 (2.4%)	387 (3.2%)	783 (4.3%)	674 (4.3%)	123 (0.9%)	297 (1.4%)	63 (0.4%)

Table 5
New Zealand Attitudes and Values Study, 2009–2017: Breakdown of Religious Affiliation and Volunteering Each Year

Variable	2009 (n = 6,518)	2010 (n = 4,441)	2011 (n = 6,884)	2012 (n = 12,179)	2013 (n = 18,261)	2014 (n = 15,820)	2015 (n = 13,942)	2016 (n = 21,936)	2017 (n = 17,072)	All cases (n = 117,053)
Volunteers										
Not volunteers	4,760 (73.0%)			8,231 (67.6%)	12,181 (66.7%)	10,530 (66.6%)	9,158 (65.7%)	14,640 (66.7%)	11,241 (65.8%)	70,741 (60.4%)
Volunteers	1,659 (25.5%)	^a	^a	3,638 (29.9%)	5,249 (28.7%)	4,744 (30.0%)	4,418 (31.7%)	6,548 (29.9%)	5,423 (31.8%)	31,679 (27.1%)
Missing	99 (1.5%)			310 (2.5%)	831 (4.6%)	546 (3.5%)	366 (2.6%)	748 (3.4%)	408 (2.4%)	14,633 (12.5%)
Religious										
Not religious	3,533 (54.2%)	2,418 (54.4%)	4,037 (58.6%)	6,858 (56.3%)	10,599 (58.0%)	9,116 (57.6%)	7,975 (57.2%)	13,365 (60.9%)	10,872 (63.7%)	68,773 (58.8%)
Religious	2,826 (43.4%)	1,941 (43.7%)	2,683 (39.0%)	4,934 (40.5%)	6,879 (37.7%)	6,030 (38.1%)	5,844 (41.9%)	8,274 (37.7%)	6,137 (35.9%)	45,548 (38.9%)
Missing	159 (2.4%)	82 (1.8%)	164 (2.4%)	387 (3.2%)	783 (4.3%)	674 (4.3%)	123 (0.9%)	297 (1.4%)	63 (0.4%)	2,732 (2.3%)

Note. A key advantage of Hidden Markov Models is their capacity to infer rates of change, even with missing data.
^a Volunteering information was not asked in 2010 and 2011.

behaviors as compared with (a) people who do not report religious affiliation and (b) people who retain religious affiliation.

Data analysis strategy. To obtain hidden Markov models of sequential stability and change in religious un/affiliation and zero/volunteering, we used the seqHMM package in R (Helske & Helske, 2019). This package is designed for modeling multiple interdependent sequences within people as hidden Markov processes. A parsimonious model of multistate change assumes four states: (a) religious not-volunteering, (b) not-religious not-volunteering, (c) religious volunteering, and (d) not-religious volunteering. Our hidden Markov model assumed that these latent states are measured imperfectly with the four combinations of responses to religious affiliation (yes/no) and volunteering (yes/no). In cases where participants reported at only one time point, the single responses did not inform the statistical model. Likewise, missing responses at any time point did not inform the hidden Markov model. The model assumed that people may remain stable in any of these four states over time, or may transit between one state to any of the others them.

The following packages in R were used (Helske & Helske, 2019; R Core Team, 2012; Wickham et al., 2019; Wickham & Francois, 2015): Religious affiliation sequences and religious volunteering sequences were obtained using the 'seqdef' command in the seqHMM package in R. These sequences were combined into a set of two lists. This list was passed to seqHMM using the 'build_hmm' command to obtain initial estimates for (a) the initial probability distribution for the four underlying states, (b) the transition probabilities for the four states, and (c) the emission

probabilities for the four underlying states as indicated by the two sequences of religious affiliation and volunteering measurements. These preliminary probability matrices were passed to seqHMM using the 'fit_model' command.

Analyses. The estimates for the initial states, transition, and emissions probabilities for the population are detailed in Table 6. Recall that the emissions probabilities are the estimated probabilities that a combination of indicators records one of the four subpopulations of interest (the four combinations of: R+/R-/V+/V-).

Results

The results for the hidden Markov model for stability and change among these four states are given in Table 6. State 1 identifies the religious/not-volunteering subpopulation (R+/V-); State 2 identifies not-religious/not-volunteering population (R-/V-); State 3 identifies the religious/volunteering population (R+/V+); State 4 identifies the not-religious/volunteering population (R-/V+). The emissions matrix provides the estimates the indicators for religious affiliation and volunteering record the underlying states for these four latent subpopulations. The transition probability matrix provides the estimated annual rates of stability and movement for individuals within/between these four states.

State 1: Religious not-volunteering cluster. The state of religious/not-volunteering (R+/V-) is estimated to have an initial probability in the population of $Pr = .27$

Table 6
Estimates for the Initial States, Transition, and Emissions Probabilities in Study 3

Initial probabilities				
State	Religious, not-volunteering	Not-religious, not-volunteering	Religious, volunteering	Not-religious, volunteering
	.269	.485	.139	.107
Transition probabilities				
	To religious, not-volunteering	To not-religious, not-volunteering	To religious, volunteering	To not-religious, volunteering
From religious, not-volunteering	.9212	.0377	.0425	.0025
From not-religious, not-volunteering	.0108	.9527	.0002	.0362
From religious, volunteering	.0526	.0000004	.9302	.0173
From not-religious, volunteering	.0032	.0795	.0122	.9052
Emission probabilities				
	Not-religious		Religious	
Religious, not-volunteering	.0671		.9329	
Not-religious, not-volunteering	.9597		.0403	
Religious, volunteering	.0316		.9684	
Not-religious, volunteering	.9461		.0539	
	Not-volunteering		Volunteering	
Religious, not-volunteering	.919		.0805	
Not-religious, not-volunteering	.948		.0520	
Religious, volunteering	.135		.8647	
Not-religious, volunteering	.165		.8350	

State 2: Not-religious not-volunteering cluster. The state of not-religious/not-volunteering (R-/V-) is estimated to have an initial probability in the population of $Pr = .49$

State: 3 Religious volunteering cluster. The state of religious volunteering (R+/V+) is estimated to have an initial probability in the population of $Pr = .14$

State 4: Not-religious volunteering cluster. the state of not-religious volunteering (R-/V+) is estimated to have an initial probability in the population of $Pr = .11$

Consistent with previous research on religious prosociality (e.g., Shariff et al., 2016), we find that volunteering occurs in about a third of the religious subpopulation yet is about twice as rare in the nonreligious subpopulation. This observation supports a religious prosociality model according to which religion amplifies helping behaviors toward others.

Transition probabilities. The religious residue hypothesis predicts that after leaving religion, religious deidentifiers should still think/ behave in ways that are similar to religious people. To assess this model, we must focus on what happens to people who are in State 3 (religious volunteering) after they disaffiliate. Do religious disaffiliates tend to retain their volunteering behavior, as predicted by the religious residue hypothesis (i.e., move to State 4: Not religious/volunteering), or is there a tendency to also losing helping behavior (i.e., move to State 2 (nonreligious/not volunteering)? Consistent with the religious residue hypothesis, we observe that among the cluster of religious people who volunteer, the annual probability of shifting to the disaffiliated volunteering cluster is $Pr = .017$. That is, in any given year, the chance of losing religion but retaining volunteering will occur in about 1.7 out of 100 people in this subgroup.

The religious residue hypothesis predicts that simultaneously losing religion and volunteering will be rare against the background rates of change. In accordance with predictions, we find the annual probability for transiting from the religious volunteering group to the nonreligious zero volunteering cluster is exceedingly rare: $Pr = 0.000000466$ or just under one in five million cases.

Trivially, the joint probability of change in two states will be equal to or lower than the individual probability of change in either state. Therefore, to assess the interest of this finding we must compare the estimated rarity of loss of volunteering and religion the probabilities of joint change between the remaining three combinations states where there is simultaneous transition in two features. The probability of moving from State 1 (rel+/vol-) to State 4 (rel-/vol+) is $Pr = .00025$; the probability of moving from State 2 (rel-/vol-) to State 3 (rel+/vol+) is $Pr = .00028$; the probability of moving from State 4 (rel-/vol+) to State 1 (rel+/vol-) is $Pr = .0032$. These estimated rates of occurrence for double state changes for the three other subpopulations are at the scale of several in 1,000 or several in 10,000 (loss of religion/gain of volunteering). To put these magnitudes in perspective, the simultaneous loss of religion/loss volunteering is estimated to occur once for every 600 cases for the next rarest transition probability (loss of religion/gain of volunteering).

Discussion

We take these estimates of individual differences between these four subpopulations to be strong evidence for an especially strong tendency to conserve volunteering after the loss of religion. Taken

together, then, the results of this large-scale longitudinal study with a nationally representative sample of participants offer strong support for the religious residue hypothesis. We observe that in a national Western sample, when religious disaffiliation occurs among religious people who volunteer, there is a very strong tendency for these people to continue volunteering. The effects of religious identification on prosociality persists. Looking ahead, reciprocal dynamics of volunteering behavior and religious affiliation, beyond the conservation of volunteering after religious loss, are topics meriting future investigations.

General Discussion

The overarching goal of our research was to determine whether having been religious at one point leaves a lasting effect on one's cognitive, emotional, and behavioral processes. More than 1.1 billion people worldwide do not identify as religious, but scientific studies have not examined (a) the prevalence of people within this group who formerly identified as religious and those who never identified as religious, and (b) whether people who formerly identified as religious show distinct psychological and behavior profiles compared with people who currently identify as religious and people who never identified as religious. Namely, our studies filled a gap by testing whether there was a religious residue effect. The results of three studies using nationally representative samples from four diverse countries provided support that formerly religious individuals differ from never religious individuals, somewhat resembling currently religious individuals, in important ways.

First, in Study 1, more than one fifth of the sample (20.94%) reported being formerly religious, which is more than half of the size of those who were never religious. If only one's current religious identification were queried—to which both the formerly and never religious individuals would report being not religious—it would obscure important differences between these two groups. Our research suggests that future scientific studies of religious identification will benefit from disambiguating nonreligious individuals' current religious identity by asking whether or not they were ever religious, as an important functional distinction.

Second, across Studies 1–2, we found robust and reliable evidence of a religious residue effect—formerly religious individuals differing from never religious individuals—on many religious variables, including their (a) religious upbringing (i.e., CREDS), (b) attitudes toward God, religion, and other religious (and formerly religious) individuals, (c) certainty and commitment toward religious beliefs, and (d) frequency of religious practices and interacting with religious (and formerly religious) individuals. Moreover, we observed these religious residue effects on implicitly assessed attitudes toward God using the God IAT, self-reported prosocial inclinations, and charitable monetary donation. Serial mediational model testing suggested that the religious residue effect affected religious upbringing, which was associated with more implicitly assessed positive attitudes toward God, which predicted more explicitly assessed positive attitudes toward God, which, in turn, was associated with greater charitable monetary donation. In Study 3, we further tested the relationship between religious identity and prosociality in a longitudinal study and found that those formerly religious individuals are still relatively

more likely to volunteer after leaving religion, providing support for the religious residue hypothesis.

Third, the results from Studies 1–2 indicated that religious identity and belief commitment have a synergistic relationship. Those who identify as currently religious and report high levels of religious belief commitment expressed the strongest explicit and implicit attitudes toward God and exposure to religious practices during childhood. The strength of these responses was followed by formerly religious individuals with high belief commitment, who in turn were followed by individuals who had never identified as religious with high belief commitment. Although exploratory, these findings suggest that religious identification and belief commitment offer a comprehensive perspective in predicting how people think, feel, and act.

More broadly, our studies suggest that enduring features of identity become resistant to change, even after people jettison them through deidentification. This is consistent with prior work that has shown that identity may be difficult to change, and when change does occur, it is usually gradual (Burke, 2006). People may stop identifying as religious, but their deeply ingrained attitudes, values, and behaviors that encompass religious identity remain, leaving them in a psychological “no-one’s land” between those who currently identify and those who have never identified. Our findings shine a light on the complex world that formerly religious individuals navigate, one where their implicit and explicit associations, attitudes, and behaviors do not always match their currently stated religious identity. By understanding the psychology of religious deidentification, social and personality psychologists can follow in the footsteps of William James (1902), who suggested that the study of religion offers broad truths about the fundamental nature of human psychology.

Our results were robust across four different countries, suggesting that the religious residue effect appears to be cross-cultural. Prior work has suggested that certain features of religion are universal (Saroglou & Cohen, 2013), though they may have culturally specific expressions. The work here aligns with the research on the universal features of religion by demonstrating that in each culture, those who deidentified from religion still showed lingering effects of religious residue in their psychology and behavior. Although the expression of how this residue may be particularly nuanced deserves future empirical attention, the cross-cultural support for this hypothesis is compelling.

Varieties of Religious Deidentification

The results of our studies revealed that religious psychology and behavior persists following deidentification. However, we suspect that the process of deidentification could take a variety of forms and may look differently depending on the individual. First, some individuals may stop believing. That is, they may have once held supernatural beliefs (e.g., belief in a God or gods) and no longer hold such beliefs. As their beliefs have changed, so too has their identification, and they decide to longer identify as religious because it no longer accurately reflects an internal state of belief consistent with religiousness. A shift in identification reflects the cognitive–behavioral consistency of a lack of religious belief.

Some individuals may deidentify because they have stopped practicing religious behaviors or rituals. For some, they may simply stop going to church, praying, meditating, reading religious

texts or scriptures, or participating in religious activities. The religious deidentification process could be deliberate (e.g., deciding to no longer identify as religious and stopping religious practices) or it could be reflective (e.g., after reflecting that one has ceases religious practices, realizing that they are no longer religious). Such individuals may still retain religious or supernatural beliefs, or may still engage in spiritual practices, although they do not identify as religious.

Still other individuals may want to disaffiliate from religion, either because the term is no longer useful or positive to them, or they no longer want to be associated with religion or other coreligionists. For example, the 2016 United States presidential election revealed that an overwhelming majority of Christian evangelicals (i.e., 80%) voted for Donald Trump (Pew Research Center, 2016). For religious individuals whose political or moral values did not align with Donald Trump or his policies, such individuals may have been motivated to distance themselves from the label “religious” as it no longer felt as though it fit, or because of the potentially inaccurate (or negative) associations others might conjure once hearing that one was religious. In a similar fashion, following the revelation of the widescale abuse by clergy in the Catholic Church, it is possible that some religious individuals no longer wanted to associate with religion and may have deidentified as a result.

Other individuals may deidentify from religion and develop antipathy toward religion or other religious individuals. Perhaps their previous religious identity is a source of pain or stress, and they have developed more negative attitudes toward God, religion, or other religious individuals. For some, these new sentiments may become a relatively enduring pattern of emotional and cognitive predilections, and for others, they may represent a transitory state of anger and negative attitudes during a period of reconfiguration and reorganization of one’s religious and spiritual beliefs.

We see future work that provides further clarification regarding the nature of deidentification and the types of religious deidentification processes would prove valuable. Some recent work suggests empirically distinguishable profiles of nonreligious individuals, including religious dones (McLaughlin et al., 2020). Better understanding the reasons why people stop identifying as religious, as well as the concomitant consequences on psychology and behavior for each kind of religious done, is an important next step in advancing research on religious identity more broadly. Moreover, it can add to the broader literature on individual differences in religious belief, behavior, and identity.

Limitations and Future Directions

Study 1 was a nationally representative sample from three diverse countries (i.e., United States, Netherlands, and Hong Kong). Study 2 was a focused replication from these countries. All countries showed clear signs of religious residue, with slightly stronger effects in Hong Kong than in the United States or the Netherlands. Study 3 examined a national representative sample in a longitudinal study in New Zealand. Thus, these results are highly generalizable and reliable. However, there were some limitations in the current investigation that can inform future research.

First, we did not expect that current and formerly religious people, compared with never religious people, would report elevated negative explicit attitudes toward God, an effect we observed

in both Studies 1 and 2. Although this relationship was unexpected, it is possible that current and formerly religious people feel a longer and more engaged relationship with God compared with people who never identified as religious, which contributes to their having stronger positive and negative attitudes toward God. Similarly, it is possible that never religious individuals simply did not believe in a God toward whom they could have negative emotions. Prior research on anger toward God (e.g., Exline, Park, Smyth, & Carey, 2011) reveals that religious individuals regularly hold negative attitudes toward God; they also hold positive attitudes. Put simply, being in a relationship (or perceiving a relationship) likely elicits both positive and negative attitudes toward that entity, and never religious individuals may not perceive much of a relationship with God at all. Notably, however, the findings on implicitly assessed attitudes toward God were in the expected direction.

Second, although we replicated and extended most of our effects related to prosociality, our most consistent effects related to self-reported helpfulness and donation of money to charity. We also found longitudinal evidence of the religious residue effect on volunteering. In similar vein, future research would benefit by continuing to use longitudinal models (as in Study 3) to understand factors that predict religious deidentification, reidentification, and the accompanying shifts in psychological and behavioral outcomes. Moreover, we encourage future work to examine other core psychological processes, such as decision-making and daily variation in mood or religious cognitions, as well as some of the other more negative components of religiousness, such as prejudice (Brandt & Van Tongeren, 2017). Put differently, although religion was found to be associated with prosociality, it is not a panacea, and future work should explore other outcome variables. It is also an open question as to how religious deidentification affects previously documented associations between religiousness and mortality and suicide (Li, Stampfer, Williams, & VanderWeele, 2016; VanderWeele, Li, Tsai, & Kawachi, 2016). Such possibilities await future inquiry.

Third, Studies 1 and 2 relied on online data collection. Given the potential pitfalls of such a research methodology (Zhou & Fishbach, 2016), we encourage future work that replicates these findings using additional in-person methodologies. Moreover, our samples in Studies 1 and 2 were designed to match the national composition of the population of each country across age, gender, and ethnicity; however, given that these data were collected online through data panels, it is possible that they were not fully representative of all citizens in those countries (e.g., not everyone has reliable and consistent access to the Internet; individuals who participate in data panels may be somewhat unique). Continuing this line of work with increasingly diverse samples and methodologies seems fruitful.

Concluding Remarks

Religion is a powerful force. Once someone identifies as religious, schematic changes and religious habits appear to linger, even after deidentification. A religious residue effect remains for formerly religious individuals on key religious cognitive, emotional, and behavioral indicators. Similarly, this effect emerges for self-reported prosociality and prosocial behaviors. Over the next 35 years, approximately an estimated 100 million additional people worldwide will identify as religious nones. Understanding

whether these individuals are formerly religious or never religious will prove useful to understand the implications of global shifts in religious identification on individual-level psychology and society-level outcomes, such as charitable giving. Taken together, this research suggests that formerly religious and never religious individuals may differ on important domains, and future work should carefully disambiguate religious identity to clarify if non-religious individuals were formerly religious. Finally, this work reveals that among religious “nones,” religious “dones” may still demonstrate lingering effects of their previous religious identities.

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